



Invasive Alien Species and Protected areas: A Scoping Report Part II.

Suggestions for an IUCN approach
to addressing present and future threats
from invasive alien species in protected areas.

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INVASIVE ALIEN SPECIES AND PROTECTED AREAS SCOPING REPORT

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Species Programme (GISP)**

PART II

SUGGESTIONS FOR AN IUCN APPROACH TO ADDRESSING PRESENT AND FUTURE THREATS FROM INVASIVE ALIEN SPECIES IN PROTECTED AREAS

Produced by Maj De Poorter (Invasive Species Specialist Group of the
Species Survival Commission of IUCN - The World Conservation Union)

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1 SUMMARY OF MANDATE

IAS was recognised as an emerging issue at Vth IUCN World Parks Congress (Durban 2003):

"Management of invasive alien species is a priority issue and must be mainstreamed into all aspects of protected area management. The wider audience of protected area managers, stakeholders and governments needs urgently to be made aware of the serious implications for biodiversity, protected area conservation and livelihoods that result from lack of recognition of the IAS problem and failure to address it. Promoting awareness of solutions to the IAS problem and ensuring capacity to implement effective, ecosystem-based methods must be integrated into protected area management programmes. In addition to the consideration of benefits beyond boundaries, the impacts flowing into both marine and terrestrial protected areas from external sources must be addressed."

For this threat to protected areas to be addressed, key impediments and challenges need to be tackled.

2 SUMMARY OF CHALLENGES AND SOLUTIONS

The key impediment or challenges are:

- (1) Lack of capacity for mainstreaming of IAS management into protected area management overall
- (2) Lack of capacity for IAS management at site level
- (3) Lack of awareness of IAS impacts on PAs, of the options for fighting back, and of the urgency of prevention and early detection
- (4) Lack of consolidated information on IAS issue in protected areas at national, international, and global level
- (5) Lack of information, at site level, on what alien species are present, what risks they pose and how to manage them
- (6) Lack of funding and other resources
- (7) High Level Impediment e.g. legal, institutional or strategic issues
- (8) Clashes of interests

The key ways to start addressing these impediments and challenges are:

(1) Develop and/or foster capacity for mainstreaming of invasive alien species issues into all aspects of protected area management (including site assessment, recognition of future threats from species that have not yet reached their invasion potential in or near the site, and management effectiveness evaluation).

(2) Develop and/or foster capacity at site level for all aspects of effective invasive alien species management (including risk assessment, prevention, early detection and rapid response as well as eradication and control).

(3) Develop and/or foster awareness at all levels, from site managers to decision makers and politicians, and also including the international conservation community, and funders.

(4) Foster development of consolidated information source(s) at national, international and global level, on invasive alien species impacts, threats and management in protected areas

3 SUGGESTED GOAL AND OUTCOMES OF IUCN'S MANAGEMENT EFFECTIVENESS WORK ON INVASIVE ALIEN SPECIES IN PROTECTED AREAS

GOAL: Biodiversity and associated livelihoods in protected areas are safeguarded from present and future impacts and threats of invasive alien species (IAS).

Outcome 1: IAS issues are consistently and competently mainstreamed into all levels of effective PA management.

Outcome 2: All present and future impacts and threats from IAS to protected area values and/or objectives are addressed effectively, efficiently and appropriately at site level.

Outcome 3: Decision makers, funders, governments and civil society at large, appropriately support management aspects of IAS in protected areas.

4 SUGGESTED IUCN OUTPUTS

The following outputs are recommended for consideration. Some will require funding; some of the "smaller" ones are already in progress. Detailed discussion follows in the next session, and the relation between outputs and outcomes is clarified in the Appendices. Note: the following sections are suggestions; the degree to which they can be taken up, or are appropriate to take up by IUCN is beyond the scope and mandate of this report to discuss. Similarly, it is beyond the mandate of this report to suggest or discuss what the role of others should be, such as GISP and its partners.

- (1) "Awareness" publications
- (2) Publication of "Guiding principles for addressing invasive alien species in protected areas"
- (3) Publication of ecosystem and/or habitat specific guidance" for addressing invasive alien species in protected areas (a series with several publications, covering key ecosystems or habitats)
- (4) Development of an IUCN Informal Network on Invasive Species in Protected Areas (INISPA)
- (5) Development of a specific checklist that funders can use to screen IAS site-based management proposals for likely success with regards to biodiversity and livelihood outcomes
- (6) Improve PA managers' access to global IAS species information and site-based management information (maximising existing tools such as the Global Invasive Species Database)

- (7) Work towards the development of national, international and global level consolidated information on invasive alien species, impacts, threats and management in protected areas
- (8) Review how IAS are dealt with in PA related assessments and PA management evaluation toolkits/guidelines or processes
- (9) Publication on "Surveys, monitoring, risk assessment and prioritising to safeguard protected areas from invasive alien species (site based management).

5 DISCUSSION OF SUGGESTED OUTPUTS

5.1 "Awareness" publication

An awareness raising publication is a key priority - aimed at people within the PA system such as PA agency HQ decision makers, Ministers, politicians, Funding agency people, but also PA managers (sites) and staff, PA stakeholders, others who work in Conservation, and the community at large. Content: half text and half pretty pictures, boxes with "catchy" examples of impacts on PA and of successful prevention and fighting back, case studies, etc. Take home message "IAS are a threat to PA values and objectives. If a PA isn't threatened yet, it will be in future. However, there are many ways to fight back, and biodiversity (and/or livelihood) outcomes result from addressing IAS, such as improving status of endangered species, restoring ecosystem functions, etc. Eradication and control methods improve all the time and show great results, but prevention as well as early detection and rapid response are even higher priorities for future proofing PAs. We need to cooperate with each other, and some attitudes may need to change.

This should be an easy format, maybe B4 or B6. Approximately 50-70 pages.

There should also be a "catchy", nice colour, 10-page version to distribute at meetings of CBD, RAMSAR, WCC, and WH. This should also be used with other key audiences such as bilateral and other Aid providers, International Conservation Funding Foundations etc.

ISSG has already started on assembling a similar product in the context of developing information for its website, but completion of this web product will depend on available resources through 2007 (not conformed yet). Time frame: second half of 2007.

Resourcing: if the ISSG web product can be finalised (resourcing not confirmed at this stage), then getting a text drafted and circulated for comments in a publication format would not require further resourcing but funding would be required for finalising, and hard copy publication, and translation in French and Spanish etc.

5.2 Publication of "Guiding principles" for addressing invasive alien species in protected areas

We recommend that such guiding principles should be considered as part of the IUCN WCPA Best Practice Protected Area Guideline Series. Aimed at PA decision makers, PA site managers, PA-IAS project people, but also PA stakeholders, people who want to start community based IAS management projects and others with an interest. This publication would provide an introduction to the IAS issue and how IAS impact PA values and objectives. It would explain how IAS in PAs can be addressed, but it would not go into detail about specific methods for specific IAS species. Whereas existing publications focus on IAS at national level and often at IAS in the wide sense, this would be aimed at PA level (site or system), and focus on IAS that potentially impact PA values and objectives (such as native species, habitats, ecosystem functions, associated livelihoods and PA objectives). It will include aspects of effective PA management in addition to effective IAS management. It needs to include mainstreaming IAS into PA management as well as effective IAS management. Emphasis should be on prevention and early detection / rapid response. It should include key approaches to management (stakeholder consultation, adaptive management, ecosystem approach, importance of awareness and attitude) as well as specifics of management (types of management such as prevention, early detection (surveillance/surveys)/rapid response, eradication, control, mitigation, and what sorts of methods exist within these types (e.g. chemical, physical, biological control). Risk assessment, prioritisation, monitoring etc. will be included. The publication would contain approximately 200 pages. In addition to hardcopy, the publication could be distributed on CDROM. Comments received from IAS/PA experts, on such publication, include:

The best sort of content is a step-by-step manual of what people need to do, recommending training contents, explaining the need for them to understand vectors and pathways and establish prevention strategies to avoid new introductions, establish an early detection and rapid response system, and control + restoration procedures for existing invasive species of plants and animals (generic methods to be explored, including the value of chemical control) (Sílvia R. Ziller, Instituto Hórus de Desenvolvimento e Conservação Ambiental, Brasil).

A toolkit on IAS management in PAs may be a complicated issue. The content should depend on the level of awareness among the target group. I'm sure PA staff in New Zealand don't need to be told how important IAS issue is, and they would rather see concrete prescriptions of how to get rid of an alien from their area. [But] PA staff in Poland at first would have to be enlightened about the whole IAS problem, and then instructed what to do to reduce it. It seems that in the majority of Polish PAs, the first step to reduce it would be to actually see what is there (Wojciech Solarz, Institute of Nature Conservation, Poland).

My initial thoughts are that we need some tools to raise awareness of the issue, but also share ready-to-go examples, case studies, and lessons learned about how a PA manager at the system or site level might think about attacking the problem of invasive species (Jeffrey D. Parrish, Global Protected Areas Strategy, The Nature Conservancy, USA).

Producing such guiding principles requires an understanding of both protected areas management and IAS management, given that they must be adapted and focussed on site-based management, useful for people with a wide range of capacity and resourcing, and that they must deal with the realities of PA management (resources and capacity, but also governance and stakeholder issues, landscape/neighbouring areas etc).

Resourcing for producing a draft text and for coordinating expert input and review would be required. Funding would be required in addition, for publishing and translation (French, Spanish, other).

5.3 Publication of "Ecosystem based guidance" for addressing invasive species in Protected Areas

This could also be considered as part of the IUCN WCPA Best Practice Protected Area Guideline Series, or, alternatively, as part of other WCPA or IUCN NRO or IUCN Programme, depending on the ecosystem in question. It would be aimed at the same users as the Guiding Principles, but provide further detail, based on IAS and PA situation in particular ecosystems. It would contain case studies and lessons learned from real-life management that has been carried out in PAs in these situations. This publication would provide more specific information on the "common criminals/usual suspects" and what sorts of management can be applied to prevent and address these species. The content would include a general introduction on the ecosystem and its values, on IAS and why we worry about them and what we can effectively do about them. This approach compliments the Guiding Principles. The bulk of the content is 1-5 pages on each of 30-50 species of high concern (photographs, description, distribution, habitat, origin, pathways, impacts, prevention and other management that has worked (or failed and why), where to find further information,.....) This approach can assist PA managers with identifying alien species, assessing risky species in the context of the ecosystem in question, identifying threats to PA values and objectives and prioritising. It will assist practitioners to implement prevention and early detection/rapid response, as well as to address existing problems effectively.

Some key ecosystems that would need to be covered include:

(1) Wetlands. Either globally, all wetlands types; or divided up according to region/continent, or according to types of habitats such as (a) floodplains (e.g. Mekong, Kafue) (b) Rivers, lakes, other inland water (c) estuaries / mudflats (also relevant to migratory flyways). Possible support to investigate: Ramsar, US funders, Bird Life International.

(2) Grasslands (in Asia, Africa, S America) - with problems like *Prosopis*, *Acacia sp.* *Pinus sp.* etc. A lot of these species are "dual personality species" with conflicting values between those that use them and those they impact on (as well as biodiversity impacts). Issues of TEK to address these IAS are also likely of relevance. Possible cooperation to investigate: TNC-Horus Brasil, ATREE and other NGOs in India.

(3) Mountains. This is an area of growing concern – in spite of the isolation, IAS are reaching these areas. Possible cooperation to investigate: USA funders, Australian agencies / funders.

(4) Mediterranean and Macaronesia. Support to investigate: EU???

(5) There likely is a need for South America to be included as a region

(6) There likely is benefit in including Europe as a region (all? or focus on Central and Eastern Europe?).

(7) Temperate forests (USA, Europe, Asia).

(8) Tropical forests – this needs some more homework first – there is a perception that tropical forests are pretty "safe" from invasives, but there is increasing evidence that they are not.

(9) Oceanic islands? Investigate cooperation with SPREP, Cooperative Islands Initiative (CII).

(10) Marine – to be discussed with IUCN GMP, and to be complimentary to their expected output of a toolkit for MPA managers.

In first instance, ecosystems and/or regions for inclusion would have to be finalised, in consultation with stakeholders/users. A practical consideration is that the publication should aim to be authoritative and complete, but not overwhelming in complexity.

Species information can be based on existing or new profiles in the Global Invasive Species Database and other publicly available Databases, guides etc. Several species profiles will be able to be used in more than one of the guides. Coordination is required to ensure similarity of format, consistency in policy issues etc. Funding will be required for writing, publishing, and translation (English, French, Spanish, other?)

5.4 IUCN Informal Network on Invasive Species in Protected Areas (INISPA)

Members would be individuals from the WCPA, ISSG, other IUCN Commissions, and other ("outside") experts, as well as appropriate individuals from IUCN Programmes and Regional or National Offices. A "kernel" of this has already been initiated as part of this project, with interested individuals from the ISSG and WCPA Management Effectiveness networks (and other experts that expressed an interest). We recommend to let this grow "organically" during 2007, rather than imposing a a-priori structure or direction at this stage. Development of this group's activities can start through input and involvement in various PA/IAS initiatives (including, as possible, the recommended outputs in this section). Other roles would be to foster active "cross pollination" between IUCN's IAS and IUCN's PA activities in general, and, as possible, to provide technical advice in the form of peer review of feasibility plans or management plans especially for PA practitioners who are in the initial stages of starting to implement IAS management.

5.5 Develop specific checklist for funders to screen IAS management proposals for likely success with regards to biodiversity and livelihood outcomes

This could be done quickly and easily – the challenge would be to ensure funder "buy in". Maybe this concept could be jointly developed with WH bureau in Gland; Format: a checklist of 1 or 2 pages, with annotations to explain what to look for in an application and why (e.g. has feasibility study been done? has it been peer reviewed? can community / stakeholder support be shown?, can political support be shown? etc.).

The aim of such checklist is to decrease the chance that funders will fund projects that have a high risk of failure, as these are very bad precedents as well as a waste of money (note: most failures are due to bad or insufficient planning and this is why they can be recognised at the planning stage). The other aim is to increase the chances of funding for projects that are likely to succeed and that have meaningful biodiversity outcomes. The short awareness publication from output 1 would be complementing it, explaining to funders how IAS management is directly related to positive conservation and livelihood outcomes.

5.6 Improve PA managers' access to on-line globally sourced IAS species information and site based management information

At the moment, some information on IAS in PA locations is already provided in the Global Invasive Species Database. For instance, on the "Impacts" page, with a hyperlink to the specific record for the location. It would be helpful to those interested in IAS in PA if more information of this kind could be included in the profiles on the GISD, but this is labour intensive and at the moment it is limited to information available when new profiles are created. Regularly updating IAS profiles in the GISD with information, as it is uncovered, on impacts or management projects at the PA-location is not possible with current GISD resources – additional resourcing would need to be obtained for this.

It is possible to distribute the existing CDROM version of Global Invasive Species Database to PA practitioners (relevant not only for management of IAS present, but also key source of information for risk assessment, prioritising surveillance/Early detection and rapid response etc...) and to encourage practitioner's feedback. An initial trial CDROM of the GISD has been distributed to conservation Practitioners in the Pacific and has received very positive feedback. It would be useful to add specific feedback from PA practitioners from a wide range of regions /ecosystems/ capacity. An initial "pilot" distribution could be carried out for about 50 recipients (CD ROMs left over from the Pacific mail out). INISPA and others in WCPA could provide a list of recipients and ISSG could follow this up with distribution and feedback processing. This pilot does not require funding. If interest in PA practitioners is confirmed, wider distribution can be considered, e.g. with the next version later in 2007.

In addition to maintaining and developing the GISD species-focussed information, ISSG is planning to modify the contents of its website so it can improve awareness and outreach services, as well as provide more focussed generic advice on IAS management and strategies. This would be issue focussed rather than species focussed. The approach will be the Pacific "kete" approach - baskets of knowledge to share, take home, and dip into as you require. "Protected areas and IAS" is one of the issues identified for the first stage of this. Timeline: second half of 2007, pending resources for the initial IAS in PA "kete".

5.7 Development of consolidated information on invasive alien species issues and threats to protected areas

The lack of access to consolidated information on IAS issues in protected areas, at global, international or regional scale, perpetuates the problem of lack of knowledge, lack of awareness and consequently, lack of supportive action, at national or international level. The development of an easy to use source of consolidated information about IAS in PAs will make it easier to understand the international scale and significance of IAS threats to protected areas, and hence to convince those in control of resources for PA management to make them available to IAS management. A consolidated source of information also would make it possible to assess trends over time, and to evaluate whether efforts to address invasives are paying off.

There is quite a lot of information on IAS in individual sites, with some indication of their impacts, management implemented to address it, outcomes of that management et., but such information is very spread out, and dissipated; Useful information is often found in internal reports rather than in publicly available documents. Material will be in many languages other than English.

For this scoping ISSG added more records to its previously collected information of relevance to the issues of invasive alien species in protected areas. The information stored as an Excel table. this is in fact the Pilot Sample that was used as one of the information sources for this scoping (see section 2 in Part I of the report). It contains over 300 records at the moment. This collection can continue in an ad hoc way (depending on time available within present resources) – but so far only the "tip of the iceberg" has been dealt with regarding information "out there". In the short term, the next step could be to make this table publicly accessible on the ISSG web, and if possible, provide the facility for others to add to it on line.

In the longer term future, IUCN should try to facilitate the development of a system of information sharing (on line e.g.) that can access the information on IAS in the World Database on Protected Areas (WDPA), Ramsar, World Heritage, Biosphere and PALNET websites (to name just a few), as well as relevant information provided to the CBD Secretariat. Such system should also capture relevant information from other efforts, such as the GISP IAS Target 10 work in the context of the Convention on Biological Diversity's Global Plant Conservation Strategy; national and regional inventories of IAS/PAs et; The result would be an emerging global picture of the status of IAS in PA. There is further scope to also integrate, as possible, with sources of information on the impact of IAS on endangered species; ISSG is cooperating with other SSC entities to develop such footprint analysis of the role of IAS. Further brainstorming and user consultation could be initiated by INISPA.

Interested supporters (financially) would have to be identified.

5.8 Review how IAS are dealt with in PA related assessments and PA management evaluation toolkits/guidelines or processes

IAS will only be dealt with at PA level, if they are recognised as a threat. Evaluation of management effectiveness is applied more and more often. However, the degree to which IAS issues are included in such evaluation will depend not only on information availability about the IAS situation, but also about the IAS awareness in those that participate in the evaluations ("You only think about what you know"). Evaluation tools for Management effectiveness do not as such aim to evaluate the accuracy of threat identification. Further thought will be required on how IAS recognition can be improved in the protected areas management effectiveness evaluation.

Such reviews seem to fit well in the mandate of the WCPA Management Effectiveness Evaluation programme. While INISPA and ISSG may be able to develop this concept a little bit further without further resources, the actual process of reviewing processes and toolkits / guidelines and of making appropriate recommendations would likely require funding. It would also best be done in partnership with other entities in this assessment and evaluation "community".

5.9 Publication "Surveys, monitoring, risk assessment and prioritising to safeguard protected areas from invasive alien species (site based management)".

Baseline surveys to identify alien species have different technical / methodological aspects depending on the ecosystem / habitats involved. Ongoing surveillance (for Early detection and rapid response) has different requirements depending on the taxa targeted (ease of detection, taxonomy & identification issues), the biology of the species targeted (e.g. frequency of surveillance required & costs/benefits of frequency), the habitat / terrain that needs to be covered etc.. Monitoring of biodiversity outcomes can be challenging at the species level – and even more so at community or ecosystem level. Identifying threats posed by alien species (which ones are the "risk species" and what is the likely type, magnitude and significance of impacts?) requires the application of risk assessment. Risk assessment (and ranking) for invasiveness needs to deal with complex issues – not just the direct effects of an IAS on a species (such as an endangered bird being predated by introduced rats), but also indirect effects, potential ecosystem meltdown, loss of ecosystem functioning etc. Prioritising requires yet another assessment (and ranking) that is different from the risk assessment, although it has aspects in common. Prioritising also includes aspects of feasibility, likelihood of success, costs, stakeholder participation, and dealing with conflicting values, and various options for finding 'win/win' situations. Various Protected Areas agencies and others are making steady progress in site based risk assessment, or cost/benefit analysis of surveillance, etc. Others have found clever "lateral thinking" solutions for their particular issues (such as clashes of values). Others again, have started to tackle more and more complex situations. All such practical developments are extremely useful when shared with other practitioners – and surveys, surveillance, assessments, and prioritising are the foundations of effectively protecting and future-proofing protected areas in the face of growing threats from IAS.

We recommend that IUCN's role would not be to provide the content for a publication on this matter, but to allow research advances and new developments in approaches (at site level) to be shared widely. A publication in a similar format to the "Turning

the tide – eradications on islands" (proceedings from a conference) would be very useful to this aspect of safeguarding and future proofing of protected areas. It could possibly follow a conference on this specific topic. ISSG and INISPA could foster such initiative, and IUCN could facilitate the distribution of the results (e.g. proceedings).

APPENDIX: RELATING OUTPUTS TO DESIRED OUTCOMES AND THE UNDERSTANDING OR SKILLS REQUIRED THAT UNDERLIE THEM

The following tables provide a further breakdown of outcomes, to relate them to practical outcomes (column2). The understanding or skills that underlie them are also identified (column3). The priority with which this IUCN initiative should try to influence the outcomes is given in column 4: Very high (VH), High (H), medium (M) or Low(L). A Low priority does not mean that the outcome is not important, but merely that that it may be still too difficult to influence it, or that other entities are better placed than IUCN to influence it. The proposed outputs will contribute to addressing these underlying requirements, as shown in column 5. Additional points are shown in column 6. Columns 1,2,3 contain sufficient breakdown so as to be helpful for non IAS-management-experts. They also form the basis to decide on contents for the outputs.

Table 1 Key entry points into Mainstreaming IAS issues into PA (site) management, for conservation/livelihood outcomes

Step in PA management process	Outcome 1: "IAS threats/issues are consistently and competently mainstreamed into all levels of effective PA management. Components of this outcome:	Outcome 1 relies on action by PA Personnel (Decision makers, managers and staff -at site and/or system level). Underlying such action are the following abilities	Importance (VH, H, M, L)	Proposed IUCN IAS-PA outputs contributing to required PA Manager / staff abilities (col 3)	Comments
IDENTIFY /SURVEY BIODIVERSITY Identify – species, – habitats,	(1) Species/taxa identified as alien vs native (to best of abilities)	<ul style="list-style-type: none"> • Understand difference between alien vs. native species and why / how this may matter • Understands why and when input 	H	"Awareness" INISPA	Review (partnership with the other entities) and as appropriate recommend additional IAS components in publications and/or

<ul style="list-style-type: none"> - ecosystem functioning, - livelihood aspects - etc 		<p>from someone with IAS expertise is required</p>		<p>"Review existing assessment and evaluating tools"</p> <p>"consolidated information"</p>	<p>toolkits related to PA designation such as:</p> <ul style="list-style-type: none"> - CI Rapid Assessments, etc - TNC assessments etc - WWF RAPPAM, etc - IUCN Mgt Eff publications (e.g. How is your MPA doing, Guidelines for MPA, Evaluating effectiveness) - Training & capacity building for taxonomy /Para taxonomy
<p>SET PA OBJECTIVES & VISION</p> <p>Judge significance of values (including different stakeholder interests)</p> <p>Prioritise values to be protected</p> <p>Determine degree of protection</p> <p>Etc...</p>	<p>(2) Incorporate IAS situation into measurement / judgement of ecosystem integrity , and criteria to decide on:</p> <ul style="list-style-type: none"> - significance of values - urgency of protection - degree of protection - allocation of zones for different uses 	<ul style="list-style-type: none"> • Understand difference between alien vs. native species and why/how this may matter • Understand conservation value of IAS absence (especially when overlapping with presence of native or endemic species presence) e.g. with regards to significance, and urgency of protection • Understands why and when input from someone with IAS expertise is required 	<p>H</p>	<p>"Awareness"</p> <p>INISPA</p> <p>"Review existing assessment and evaluating tools"</p> <p>"Consolidated information"</p>	<p>As above</p>
<p>IDENTIFY THREATS TO PA VALUES AND CAUSES</p> <p>Identify present and future threats</p>	<p>(3) All present and future threats by IAS incorporated</p>	<ul style="list-style-type: none"> • Understand severity of threat by IAS for PA values • Understands need to include future 	<p>VH</p>	<p>"Awareness"</p> <p>"Guiding"</p>	<p>Review (in partnership with other entities in question), and as appropriate add IAS component in</p>

<p>Estimate magnitude, scale, etc</p> <p>Identify underlying causes of threats</p>	<p>appropriately in identification and evaluation of threats to PA</p>	<p>threats (including some species not yet present)</p> <ul style="list-style-type: none"> • Understands that future risks can be assessed – i.e. before any signs of invasiveness are "visible", or even before the species is present on the site • Understand that not only species need to be assessed, but also pathways • Understands why and when input from someone with IAS expertise is required 		<p>principles"</p> <p>"Ecosystem based guidance"</p> <p>"Consolidated information"</p> <p>INISPA</p> <p>"Review existing assessment and evaluating tools"</p>	<p>publications that give overview on PAs e.g.:</p> <ul style="list-style-type: none"> – WWF RAPPAM (system wide evaluation), – WWF "Are PAs working" type publications <p>Add / update existing content on IAS, and create linkages to more detailed IAS information (e.g. on species and/or management) for sites in websites such as :</p> <ul style="list-style-type: none"> – WH – RAMSAR <p>Foster cooperation and collaboration between PALNET, WDPA and ISSG/GISD/GISIN</p>
<p>PRIORITISE MANAGEMENT</p>	<p>(4) Management to address or prevent IAS appropriately incorporated into overall PA management prioritisation</p>	<ul style="list-style-type: none"> • Understands that future risks by IAS can be assessed – i.e. before any signs of invasiveness are "visible", or even before the species is present on the site • Understands IAS management is possible, and the priority for taking action at an early stage, before management becomes too difficult. • Understands potential for significant outcomes (in terms of PA objectives and vision) • Understand that almost all PA values will suffer sooner or later if IAS not addressed 	<p>VH</p>	<p>As above</p>	<p>As above</p> <p>Plus</p> <p>Review in partnership with entities in question), and as appropriate recommend to add IAS component in publications and/or toolkits on prioritising management within PAs :</p> <ul style="list-style-type: none"> – WWF RAPPAM – Other prioritising tools etc <p>Encourage incorporation of IAS</p>

		<ul style="list-style-type: none"> Understands why and when input from someone with IAS expertise is required 			related content into various capacity building and training for PA staff and stakeholders (including by International Ranges Federation, Agencies, NGOs,..)
DEVELOP MANAGEMENT STRATEGY AND /OR MANAGEMENT PLAN	<p>(5) PA Management Plan to incorporate addressing IAS (including preventative components)</p> <p>(6) IAS management receives sufficient resources out of overall PA management resources</p>	<ul style="list-style-type: none"> Understand IAS management is possible Understand potential for significant outcomes (in terms of PA objectives and vision) of addressing IAS Understand that almost all PA values will suffer sooner or later if IAS not addressed Understands that cost/benefit ratio is different long term vs short term – and long term approach is required 	H	As above	<p>As above, including</p> <p>Review (in partnership with entities in question) and as appropriate recommend to add IAS component in publications and/or toolkits and/or programmes such as:</p> <ul style="list-style-type: none"> – Management effectiveness outputs and toolkits – Capacity building / training on PA management – Management plan templates – Conservation planning guidance outputs (e.g. TNC's "Planning by design", IUCN Best Practice PA Guidelines Series etc)
IMPLEMENT MANAGEMENT PLAN	(7) All PA decision makers, managers and staff incorporate appropriate IAS related activities in their day to day work e.g. all field staff know to report "unusual/probably new" species (part of fortuitous early detection) and all managers obtain input	<ul style="list-style-type: none"> Understands IAS management is possible and necessary Understand high value of early detection and rapid response Understands why and when input from someone with IAS expertise is required Understand key role of awareness and education on IAS at all levels, and for all stakeholders (including PA personnel, visitors, neighbouring community, etc) 	VH	As above	Encourage incorporation of IAS related content into various capacity building and training for PA staff and stakeholders (including by International Ranges Federation, Agencies, NGOs,..)

	<p>from someone with IAS expertise as and where needed in their planning or decisions .</p> <p>(8) All implementation activities / tasks / outputs have IAS issue component as relevant e.g. visitor information material, guided tours, educational displays, training and up skilling of staff, participation and/or consultation of stakeholders, etc....</p>				
<p>MONITORING AND EVALUATION (M&E)</p> <p>Monitor PA management outputs and outcomes</p> <p>Report</p> <p>Evaluate</p> <p>Review planning and implementation to adapt, as required</p>	<p>(9) M&E of outputs and outcomes of PA management include an assessment of resulting IAS risks caused, and effectiveness of addressing that risk. (e.g. increasing number of visitors, opening up remote areas, construction of facilities, changes in stakeholder access for grazing or harvesting, using alien species within the park)</p>	<ul style="list-style-type: none"> • Understand that management activities can create new pathways, or increase risks associated with existing pathways, for new IAS introductions. • Understand that pathways for IAS introductions can and should be addressed • Understands why and when input from someone with IAS expertise is required 	H	As above	Encourage incorporation of IAS related content into various capacity building and training for PA staff and stakeholders (including by International Ranges Federation, Agencies, NGOs,..)

Table 2 Key entry points into site based IAS management for conservation/livelihood outcomes

Step in IAS in PA management process	Outcome 2: "All present and future threats by IAS to PA values and/or objectives are addressed effectively, efficiently and appropriately. Components of this outcome:	Outcome 2 relies on action by PA personnel with specific mandates / jobs to address IAS. (Can be decision makers, managers, and staff, IAS-expert-consultants etc, -at site and/or system level). Underlying such action are the following abilities (IAS related)	Importance (VH, H, M, L)	Proposed IUCN IAS-PA outputs contributing to required PA Manager / staff / expert abilities (col 3)	Comments
POSITIVE ATTITUDE	(1) Deep commitment to address IAS threats to PA values and conviction that no matter what the realities are that you face, there is always SOMETHING that can be done (especially at level of decision makers, managers) (2) Willingness to ask for help/ comments/ peer review and give help to peers (others in similar situation as self) (3)"job" of addressing IAS in PAs considered as	<ul style="list-style-type: none"> • Understanding that while IAS problems may sometimes seem overwhelming, in real life there are a lot of ways to fight back successfully • Understanding that even at site and individual level, there are actions that can be taken that will "make a difference" • Understanding that addressing IAS in PAs will significantly contribute towards the PA values and objectives • Understanding that peer review / asking for help is part of good planning and 	VH	Awareness" INISPA	<p>Incorporate this message in relevant IUCN publications as a matter of course</p> <p>Keep including success stories in ISSG outputs such as Aliens newsletter, GISD etc</p> <p>Improve web content ISSG web</p> <p>Incorporate / highlight this message in PALNET, WDPA, WCMC PA databases etc</p>

	worthwhile and "cool" (staff level)	management, and that the biodiversity-IAS community is usually able and willing to assist each other			Work with WH, RAMSAR etc to maximise exposure to this message in their systems
<p>INITIAL SURVEY OR RAPID ASSESSMENT OF ALIEN SPECIES ON AND NEAR SITE</p> <p>Including :</p> <ul style="list-style-type: none"> – what alien species are present in and near the PA and in what location – as much information as possible on the status of populations of alien species (degree of establishment and amount of area covered, in what habitats, degree of disturbance vs "naturalness" of the location where they occur", etc – information on potential risky pathways 	(4) Presence, location and status of alien species populations in and near the PA known, and existence of risky pathways known	<ul style="list-style-type: none"> • Understand why we need to know IAS situation - how this may matter • understand need to include areas outside the PA in the survey as appropriate • skills to carry out baseline survey for alien species (could be done outside expert) or, as a minimum, a rapid assessment (skills best within PA staff, given the need to do ongoing monitoring at a later stage) <p>-----</p> <ul style="list-style-type: none"> • Depending on the circumstance, a more specialist skill is required to assign "alien" or "native" status to species, e.g. with cryptogamic species 	VH	<p>Awareness"</p> <p>INISPA</p> <p>"Guiding Principles"</p> <p>"Ecosystem based guidance"</p> <p>Review existing assessment and evaluating tools</p> <p>"Surveys/monitoring/Site-based Risk Assessment /prioritising publication"</p>	<p>Training & capacity building for identification skills and for taxonomy /Para taxonomy should include component on recognising alien species, and why they should be "labelled" as such</p>
<p>IDENTIFICATION, ASSESSMENT AND EVALUATION OF THREATS TO PA VALUES AND OBJECTIVES,</p> <p>Identify infestations (= populations</p>	(5) present impacts by IAS on values and objectives of PA identified, and significance determined	<ul style="list-style-type: none"> • Understands that most alien species will not become invasive, but it is very important to identify or assess those that are likely to. • Understand the different 	VH	<p>"Guiding principles"</p> <p>"Ecosystem based guidance"</p>	<p>Incorporate PA-location records (distribution, impacts, management) in GISD /GISIN</p>

<p>of species present that are already being invasive) and their impacts on values or objectives of the PA</p> <p>Initial Assessment / screening of alien species present, in order to identify those that present a significant risk of invasiveness (= threat to native biodiversity or associated livelihood). These are "risk species"</p> <p>Assess potential (future) invasiveness of populations of risk species present that have not reached an invasion stage.</p> <p>Assess pathways for continued or future introduction of alien species (and assess likelihood they would be risk species) into the PA including species not yet present in the PA.</p>	<p>(6) All alien species have been subject to "screening" of some kind, and those that should be considered "Risk species" have been identified</p> <p>(7) Present and potential (future) invasiveness, and its significance, assessed for all "risk species"</p> <p>(8) Pathways for continued or future introduction of IAS into the PA identified and assessed</p>	<p>mechanisms through which IAS cause impacts, direct and indirect impacts, possible scale and magnitude of impacts, complexity, etc....</p> <ul style="list-style-type: none"> • Understands that future risks can be assessed – i.e. before any signs of invasiveness are "visible", or even before the species is present on the site • Understands that PA management activities themselves (construction, visitors, etc) can be pathways that needs assessing • Skills to identify IAS already present and their impacts • Skills to perform initial assessment/ screening of alien species for likely invasiveness (e.g. using information on prior invasiveness and/ or biological characteristics and/or observation) • Skills to perform assessment of likely magnitude and significance of invasiveness in the specific context of the PA site and its values/objectives , for "risk species" (based on various sources of information) 		<p>"Consolidated information"</p> <p>"improve access to relevant globally sourced IAS species & management information "</p> <p>INISPA</p> <p>Review existing assessment and evaluating tools</p>	<p>Encourage incorporation and improve "search" abilities for threats by IAS in PA in PALNET, WDPA, WCMC PA databases etc , WH database etc</p> <p>As appropriate assist RAMSAR: with user friendly presentation of IAS threats to/in RAMSAR sites and improve ease of use of information already in system</p>
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		<ul style="list-style-type: none"> skills to identify and assess pathways (in the context of the sit(s)) <p>-----</p> <p>Depending on circumstances, skills for more detailed risk assessments may be required</p>		<p>-----</p> <p>"Surveys/monitoring/Site-based Risk Assessment publication"</p>	
<p>PRIORITISE IAS MANAGEMENT TO ADDRESS THREATS TO PA VALUES AND OBJECTIVES</p> <p>Prioritisation of what species / not widely established infestations/ pathways should be addressed through prevention (= blocking the pathway or intercepting the organisms) , and/or Early detection and Rapid Response (EDRR) (= detecting organisms or populations/ infestations that are not widely established yet, and taking appropriate and rapid action)</p> <p>Prioritisation of what IAS post-establishment populations/infestations should be addressed (Eradication, control, mitigation)</p> <p>Overall prioritisation of both above, based on maximising long term biodiversity and livelihood</p>	<p>(9)Priorities for IAS management set to maximise long term biodiversity (and livelihood) gains, using criteria of</p> <ul style="list-style-type: none"> - likely invasiveness of IAS species - significance of the PA value/objective under threat - extend of presence/infestation of IAS species -likelihood of management success - financial realities -other criteria of relevance (degree of political and/or stakeholder support, degree of controversy, specific situations etc) 	<ul style="list-style-type: none"> Understanding the reasons for giving high priority to prevention (blocking pathway, intercepting organisms) as well as to early detection and rapid response (EDRR) Understanding on need to take "long term view" Understand to base decisions on biodiversity/livelihood outcomes (including ecosystem functioning) Skill to determine priorities for prevention and /or EDRR (based on pathways, likely degree of invasiveness etc) Skill to determine priorities for post-establishment management of populations of IAS on site (based on invasiveness, extend of infestation, likely 	VH	As above	Ensure easy access to PA effective management information and publications

outcomes		<p>success and ease of management, etc)</p> <ul style="list-style-type: none"> • Understand the different management types (Prevention, EDRR, Eradication, Control, Mitigation) and criteria for success. 			
<p>DEVELOP MANAGEMENT STRATEGY AND /OR MANAGEMENT PLAN</p> <p>Decide on suitable management type for each case: prevention, EDRR, Eradication, Control, Impact mitigation</p> <p>Decide on most likely successful suitable method (e.g. mechanical removal, biological control, chemical control, cleaning of gear and shoes before entry,.....) and specific method technicalities</p> <p>Develop feasibility study, including the reasons why the management is proposed (biodiversity / livelihood outcomes expected), available methods and preferred method, resourcing issues, risks and how they will be addressed, Monitoring and evaluation .. Include consideration of issues relating to</p>	<p>(10) Management type selected that is feasible and appropriate and method selected that is likely to succeed and appropriate.</p> <p>(11) Feasibility study developed, stating desired outcomes, timelines, methods proposed, resource requirements, stakeholder issues, risks and how they will be addressed</p> <p>(12) Stakeholder input obtained, and expert comments and advice obtained through peer review</p> <p>(13) Management Plan prepared that incorporates findings from feasibility</p>	<ul style="list-style-type: none"> • Understand the different management types (Prevention, EDRR, Eradication, Control, Mitigation) their criteria for success, and the cut off points between the types. • Understand and know key methods for each type of management, and their strengths and weaknesses • understand key value of stakeholder participation and expert peer review. • Understand key role of awareness and education on IAS at all levels, and for all stakeholders (including PA personnel, visitors, neighbouring community, etc) • Skills to develop feasibility study • skills to develop management plan 	VH	<p>"Awareness"</p> <p>"Guiding principles"</p> <p>"Ecosystem based guidance"</p> <p>"Improve access to relevant globally sourced IAS species & management information "</p> <p>INISPA</p> <p>-----</p> <p>"Surveys/monitoring/Assessment publication"</p>	<p>Ensure easy access to PA effective management information and publications</p> <p>Aspects of management effectiveness need to be part of training for personnel that manage IAS in PA</p> <p>INISPA, ISSG, WPCA networks and existing Listservs can be of assistance with peer review</p>

<p>ecological, stakeholder ,social, financial and political support)</p> <p>Foster stakeholder participation, obtain advise from various experts through peer review</p> <p>Prepare management plan incorporating findings of feasibility study, and addressing comments and recommendations</p> <p>Continue stakeholder participation and input from experts as appropriate</p>	<p>study as well as the advise and comments received. Further stakeholder and peer input in Management Planning.</p>	<p>understand and practice: adaptive management, ecosystem approach, stakeholder participation, long term approach, technicalities of specific methods</p> <ul style="list-style-type: none"> • stakeholders understand IAS issues 			
<p>IMPLEMENT MANAGEMENT PLAN FOR PROJECTS THAT ADDRESS IAS</p> <p>Produce operational plan, covering activities, tasks etc.</p> <p>Produce contingency plan(s) for rapid response</p> <p>Train personnel for required skills, ensure they know procedures, their role in them etc...</p> <p>Produce education and awareness material etc for visitors stakeholders etc so that non-personnel can be informed on their roles as well</p> <p>Carry out implementing activities and tasks</p>	<p>(14) For each project, operational plan /manual/ standard operational practices have been prepared.</p> <p>(15) Personnel know their role, and have skills to perform that role. Expectations, responsibilities and mandates are known and understood by all.</p> <p>(16) Implementation activities and tasks are carried out effectively, efficiently and appropriately (see fig of management effectiveness</p>	<ul style="list-style-type: none"> • Appropriate understanding for all personnel / stakeholders with regards to effective IAS management • Appropriate understanding for all personnel on PA management effectiveness in general • Appropriate understanding and awareness for visitors and stakeholders in general 	M/H	As above	Encourage incorporation of IAS related content into various capacity building and training for PA staff and stakeholders (including by International Ranges Federation, Agencies, NGOs,..)

<ul style="list-style-type: none"> - Prevention - Early detection (including surveillance) - Rapid response - Eradication - Control - Mitigation of Impacts - Monitoring and evaluation - Awareness raising / education and outreach - Engage in stakeholder participation 	<p>in general)</p> <p>(17) visitors and stakeholders in general support the management and know what they can / should do and understand why their participation is important</p>				
<p>MONITORING AND EVALUATION (M&E)</p> <p>Monitor and report on IAS management outputs and outcomes (e.g. what was done, for how long and where, how many IAS were removed / intercepted, what biodiversity response was noticed. For prevention ways to report may need to be developed that reflect the significance of "nothing found")</p> <p>Evaluate outputs and outcomes, and as appropriate review priorities, planning and implementation</p>	<p>(18) Outputs and outcomes of IAS management programmes and projects, are regularly monitored and reported.</p> <p>(19) Priorities, planning and implementation activities are reviewed and modified as appropriate</p>	<ul style="list-style-type: none"> • Understand specific needs for monitoring in IAS projects (e.g. monitoring for x years to confirm eradication) • Understand need for M&E and reporting, including on biodiversity / livelihood outcomes • Understand that "still no tramp ants present" and similar outcomes with "nothing to show" are in fact extremely positive and worthwhile outcomes <p>Skills to carry out M&E, and to review IAS programmes and projects as required</p>	<p>VH</p>	<p>As above</p> <p>(special attention may need to be given to reporting positive outcomes of prevention)</p>	<p>M&E as part of PA management in general should include evaluation of IAS risks caused by implementing activities(e.g. increasing number of visitors, opening up remote areas, construction of facilities, changes in stakeholder access for grazing or harvesting etc)</p>

Table 3 Key entry points into generating support in "the wider world" for PA- IAS management for conservation/livelihood outcomes

	Outcome 3: Decision makers, governments and civil society at large appropriately support all management aspects of IAS in PA.	Outcome 3 relies on action by various people or organisation in government as well as civil society. Underlying such action are the following abilities (IAS related)	Importance (VH, H, M, L)	Proposed IUCN IAS-PA outputs contributing to required PA abilities (col 3)	Comments
FUNDERS Outside funding agencies / foundations / bilateral or multilateral financial aid providers	<p>(1) Outside funding agencies with TOR on biodiversity conservation, protection of endangered species, and/or livelihoods etc regularly fund projects in PAs that effectively address IAS.</p> <p>(2) Outside agencies regularly fund projects in PAs for IAS prevention and/or EDRR</p> <p>(3) Outside funding agencies refrain from inadvertently creating perverse incentives against good management (such as through unrealistic timelines for delivery – which encourages premature management activities, or through unwillingness to fund a sufficiently long period of monitoring after eradication – which significantly increases risk of failure)</p>	<ul style="list-style-type: none"> Understanding that PA values are under threat and future threat from IAS, in all regions, ecosystems and types of PAs. Understanding that addressing IAS in PAs will significantly contribute towards the PA values and objectives, including protection of endangered species Understanding that while IAS problems may sometimes seem overwhelming, in real life there are a lot of ways to fight back successfully Understanding of the high priority for prevention and EDRR, and their long term significant cost benefits. Understanding of the ecological realities of IAS management. Understanding the criteria for likely success in IAS 	VH	<p>"Consolidated information"</p> <p>"Awareness"</p> <p>Develop specific checklist for funders to screen IAS management proposals for likely success (e.g. has feasibility study been done, including issue X,Y Z, has it been peer reviewed, can community / stakeholder support be shown, can political support be shown, etc. (Maybe Trial for WH bureau – then expand?))</p> <p>"Guiding Principles"</p>	<p>IUCN (and others) may have opportunities during high level consultation with funders</p> <p>Find ways to keep funders in information loops (so they get exposure to IAS management success stories)</p> <p>Note: producing the checklist for funders is easy – the challenge would be to ensure funders buy in</p>

		management projects			
PA MANAGEMENT SYSTEM / AGENCY (ALSO SEE OUTCOME 1)	(4) IAS management receives sufficient resources out of overall PA management resources	See outcome 1	VH	See outcome 1	See outcome 1
STAKEHOLDERS AND VISITORS	(5) Stakeholders support IAS management and participate as appropriate (6) Community at large understands PA - IAS management needs and supports them.	<ul style="list-style-type: none"> • Understanding of IAS issue • Understanding that some populations /infestations of animals or plants need to be removed, and that chainsaws/pesticides etc can be tools for conservation in PAs • Understanding why prevention is important 	M/H	"Awareness" INISPA	Incorporate IAS issue as appropriate in PA related Awareness, education and outreach
LEGISLATION / REGULATION AT NATIONAL AND SUBNATIONAL GOVERNMENT	(7) Legislation does not create impediments to managing IAS in PA (8) National strategic approaches are developed and include IAS in PA as appropriate (e.g. in national IAS strategy and/or in biodiversity strategy and/or in national PA strategy etc...) (9) Sectors cooperate at national level	<ul style="list-style-type: none"> • Understanding of difference between alien and native species and why it matters • Understanding of biodiversity and livelihood gains that result from addressing IAS in PA (reflecting PA values and objectives) 	L (issue is important, but contribution from outputs will be L)	"awareness" INISPA	Best addressed at national policy level - however the outputs here produced may contribute to some extent